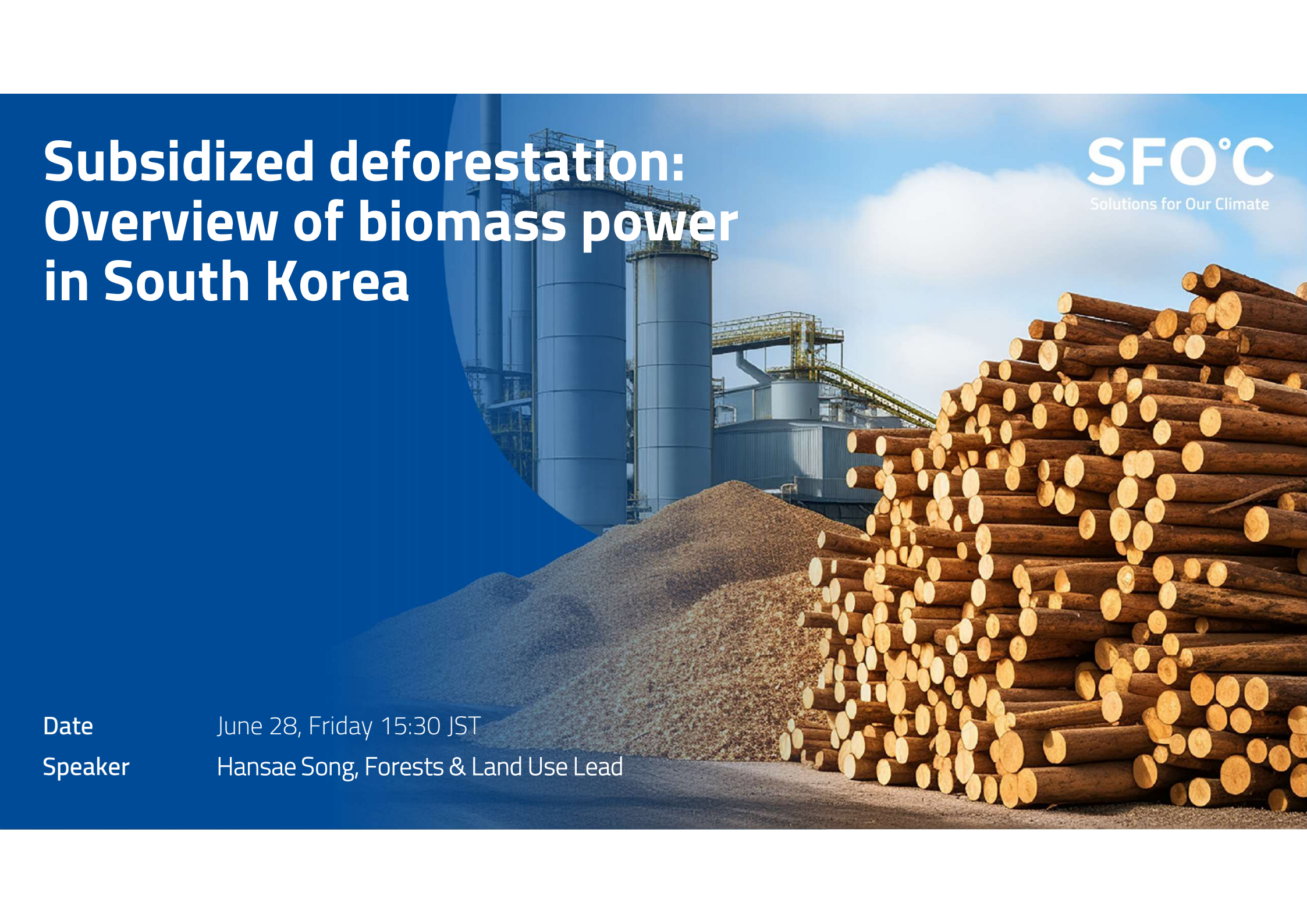


# Subsidized deforestation: Overview of biomass power in South Korea

**SFO°C**  
Solutions for Our Climate

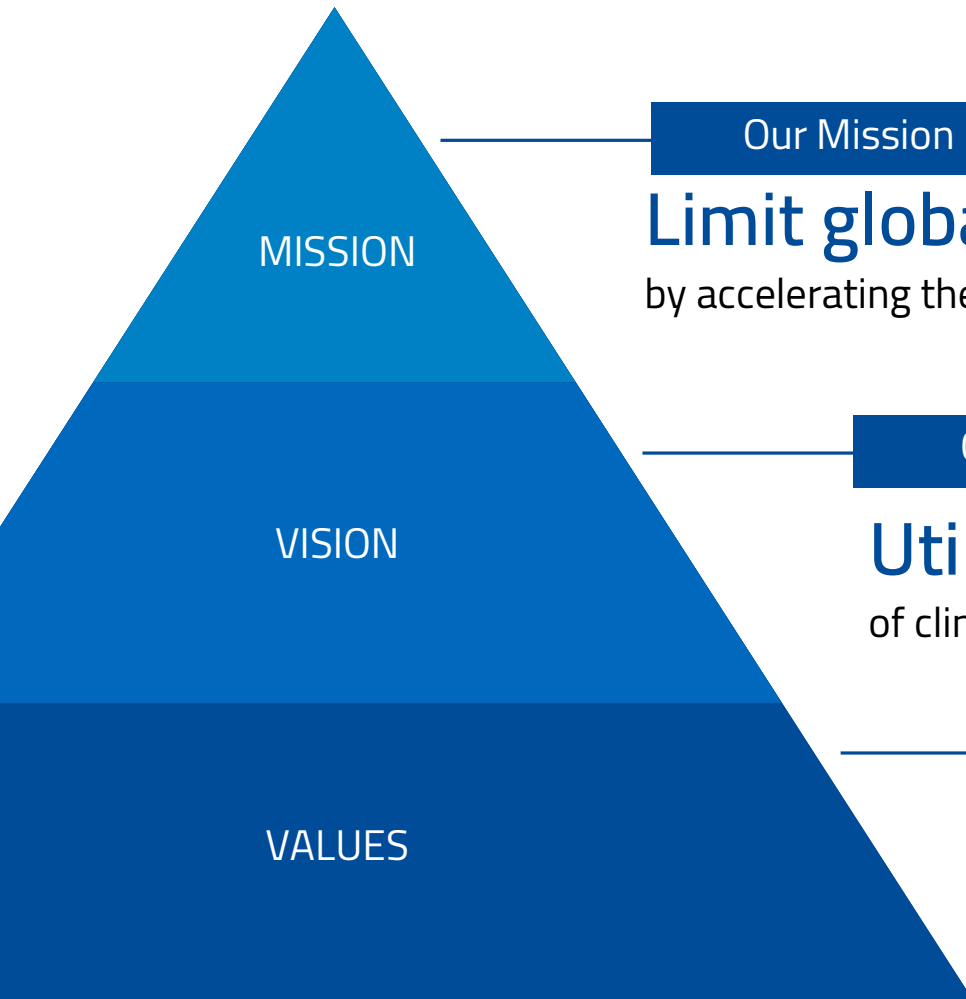
**Date** June 28, Friday 15:30 JST  
**Speaker** Hansae Song, Forests & Land Use Lead



# CONTENTS

- 1 Why stopping big biomass matters?
- 2 State of biomass power in South Korea
- 3 Governance framework of forest biomass policy
- 4 Consequences of forest & energy policy incentivizing biomass
- 5 Industry trend: From state-owned co-firing to private dedicated
- 6 Mitigating forest biomass in South Korea
- 7 Next steps for safeguarding our forests and climate

# Solutions for Our Climate



## Our Mission

**Limit global temperature rise to below 1.5C**

by accelerating the world's transition from fossil fuel to fossil free.

## Our Vision

**Utilizing our global network**

of climate actors to spread our effective message and bold solutions.

## Our Values

**People & Innovative strategies**

are the KEYS to our success.



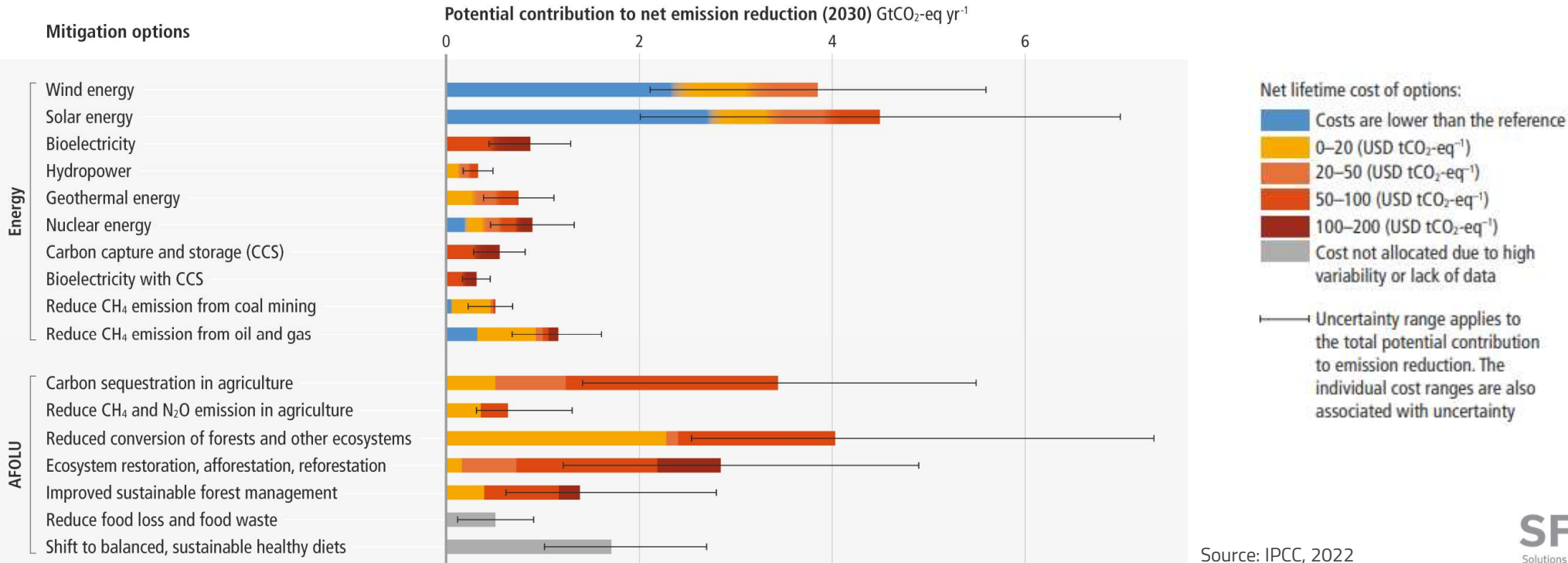
An aerial photograph of a dense, lush green forest. A dark, winding road or path cuts through the trees, curving from the upper right towards the lower center. The text '1. Why stopping big biomass matters?' is overlaid in white on the upper left portion of the image.

# 1. Why stopping big biomass matters?



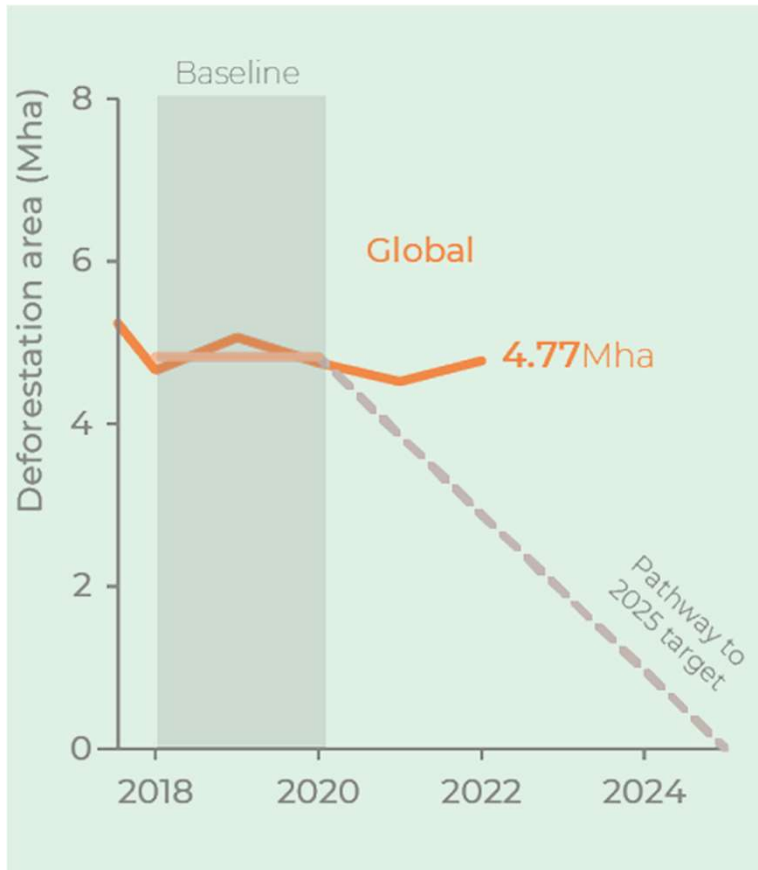
# Protecting and restoring nature has climate change mitigation potential comparable to wind and solar

Many options available now in all sectors are estimated to offer substantial potential to reduce net emissions by 2030. Relative potentials and costs will vary across countries and in the longer term compared to 2030.

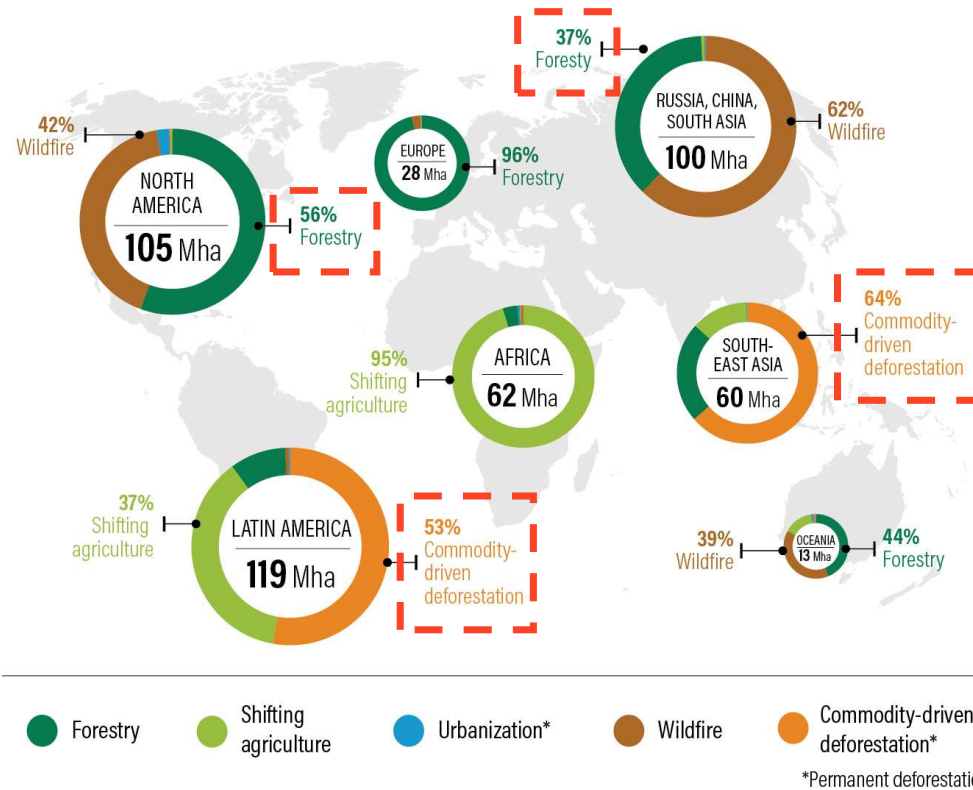


Source: IPCC, 2022

# The world is off track to end forest loss, which is driven by agricultural and forestry commodity production



Drivers of tree cover loss by region, 2001-2023



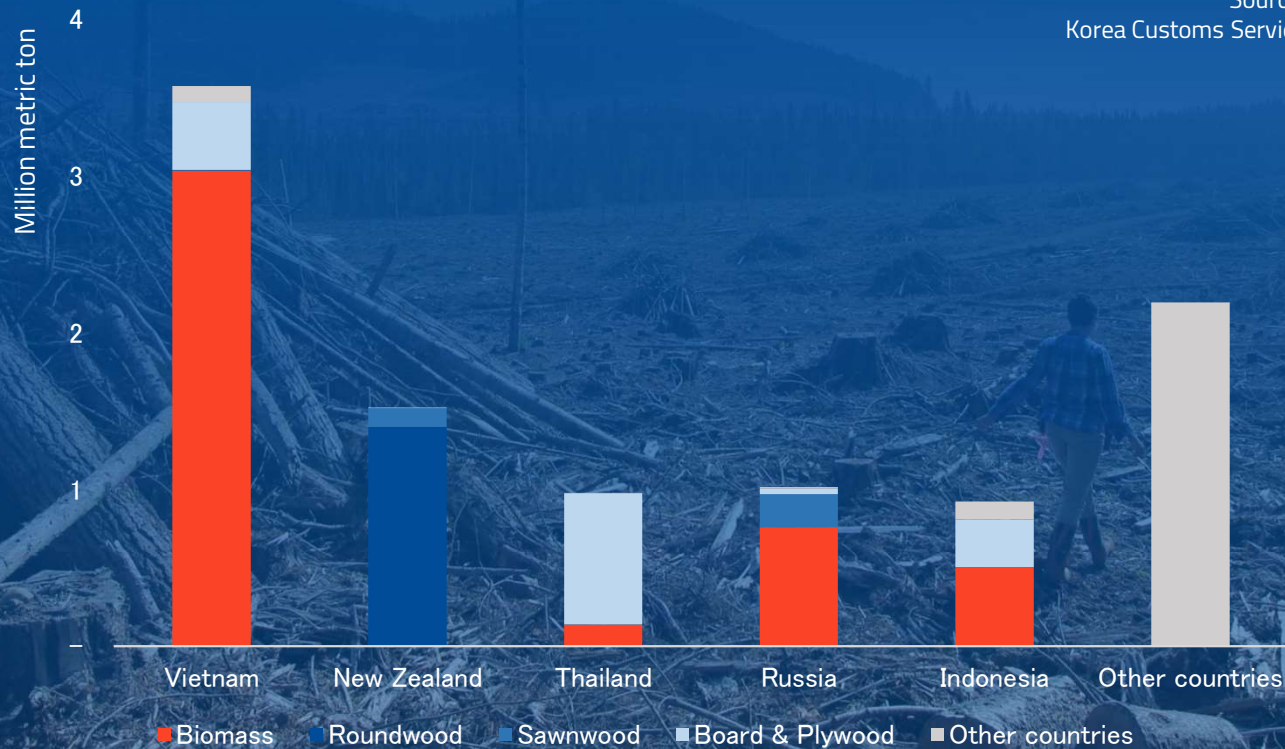
Source:  
Forest Declaration  
Assessment, 2023;  
WRI, 2024



# Wood for biomass drives the demand for 'imported deforestation' in S. Korea

S. Korea imports of wood from top exporters in 2023

Source:  
Korea Customs Service



# Biomass is a dangerous distraction from achieving global climate and nature goals

*Biomass is a false solution to climate change*

Continuing to burn biomass at the current rate will only deplete the world's dwindling carbon budget

*Biomass capitalizes on the climate and ecological crises*

Most wood is sourced from the natural and biodiverse forests of Southeast Asia, Canada, and Russia

*Abusing the carbon accounting loopholes does not make biomass 'green'*

Claiming mitigation benefits from biomass by shifting the climate and humanitarian consequences to the rest of the world is an act of climate injustice

*Biomass fails to provide economic benefits*

Biomass is a stranded industry without a clear path to cost-effectiveness or technological breakthroughs



# 2.

## State of biomass power in South Korea



### A Climate and Biodiversity Loophole

Support for Biomass Power Undermines Global Targets  
—A South Korea Case



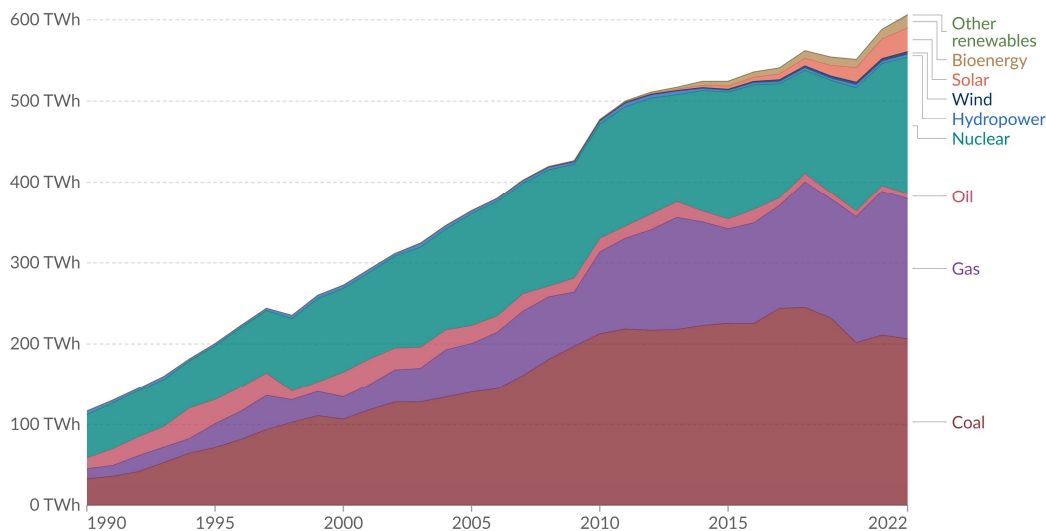
Issue Brief



# Renewable energy uptake is very slow in S. Korea

## Electricity production by source, South Korea

Measured in terawatt-hours<sup>1</sup>.



Data source: Ember - Yearly Electricity Data (2023); Ember - European Electricity Review (2022); Energy Institute - Statistical Review of World Energy (2023)

Note: Other renewables include waste, geothermal, wave and tidal.

[OurWorldInData.org/energy/](https://OurWorldInData.org/energy/) | [CC BY](https://creativecommons.org/licenses/by/4.0/)

1. **Watt-hour:** A watt-hour is the energy delivered by one watt of power for one hour. Since one watt is equivalent to one Joule per second, a watt-hour is equivalent to 3600 Joules of energy. Metric prefixes are used for multiples of the unit, usually: - kilowatt-hours (kWh), or a thousand watt-hours. - Megawatt-hours (MWh), or a million watt-hours. - Gigawatt-hours (GWh), or a billion watt-hours. - Terawatt-hours (TWh), or a trillion watt-hours.

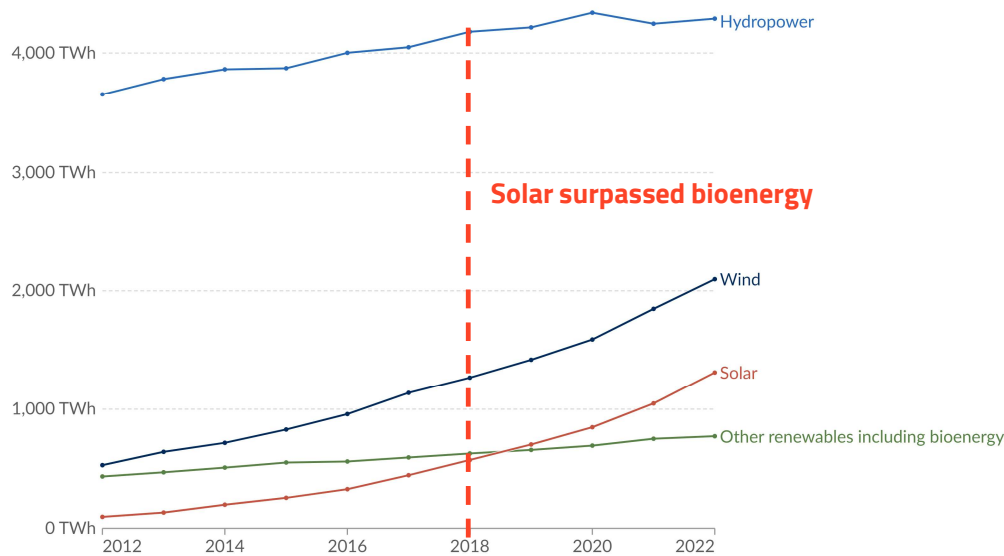
- **8.1%** → share of renewable power for electricity production
  - All bioenergy is **1.9%**
  - Solid biomass is **1.5%**
- **Bottlenecks for solar and wind uptake**
  - **Power market and grid structures** is fossil fuel-centered
  - Monopoly by state-owned **KEPCO**
  - **Regulatory barriers**
  - **Community** acceptance



# Solar and wind are driving the global energy transition

## Modern renewable energy generation by source, World

Measured in terawatt-hours<sup>1</sup>.



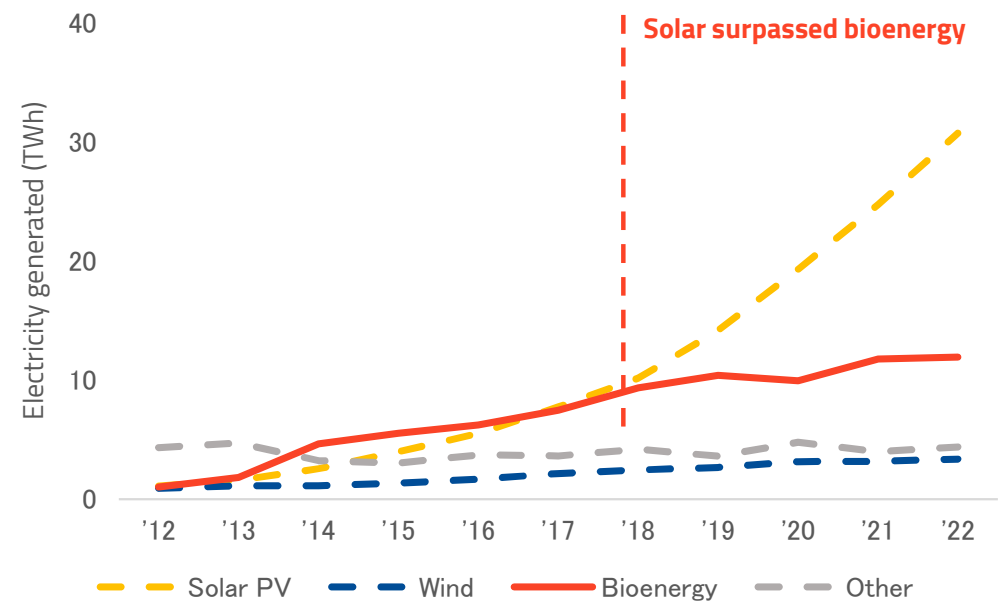
Our World in Data

Data source: Ember - Yearly Electricity Data (2023); Ember - European Electricity Review (2022); Energy Institute - Statistical Review of World Energy (2023)

[OurWorldInData.org/renewable-energy/](https://OurWorldInData.org/renewable-energy/) | CC BY

1. **Watt-hour:** A watt-hour is the energy delivered by one watt of power for one hour. Since one watt is equivalent to one Joule per second, a watt-hour is equivalent to 3600 Joules of energy. Metric prefixes are used for multiples of the unit, usually: - kilowatt-hours (kWh), or a thousand watt-hours. - Megawatt-hours (MWh), or a million watt-hours. - Gigawatt-hours (GWh), or a billion watt-hours. - Terawatt-hours (TWh), or a trillion watt-hours.

## Renewable electricity by source in S. Korea

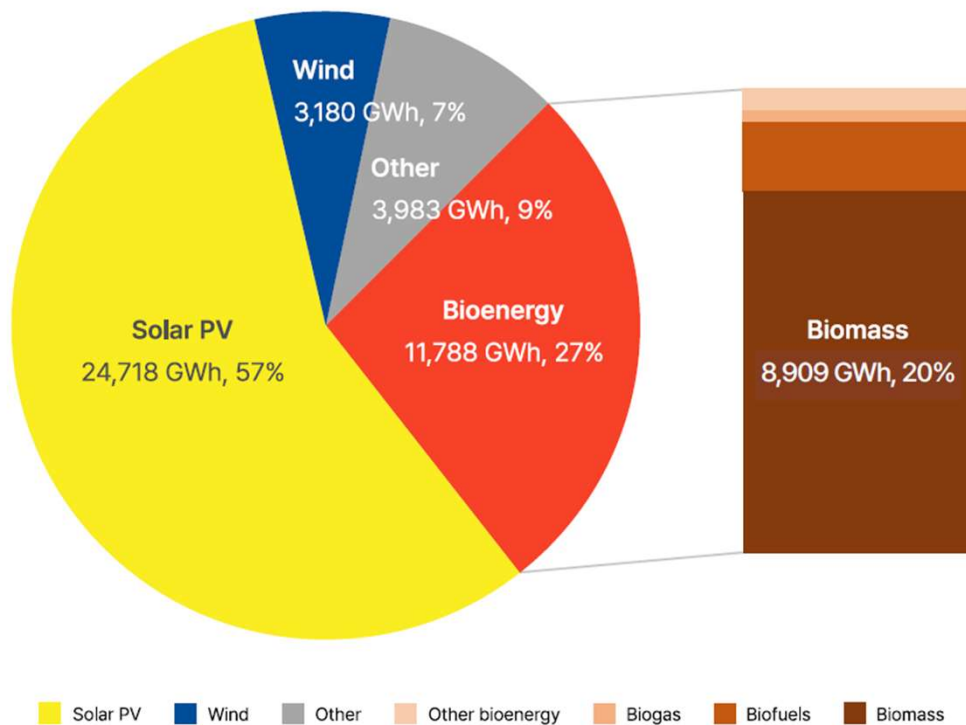


Source: Korea Energy Agency, 2019–2023

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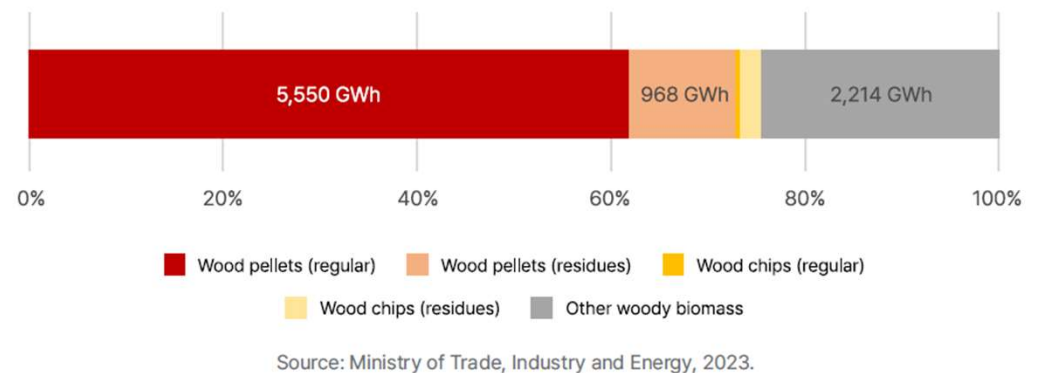
# In S. Korea, burning wood is more popular than wind to generate power

° Figure 2. Renewable electricity generated in South Korea by source, 2021



Source: Korea Energy Agency, 2022.

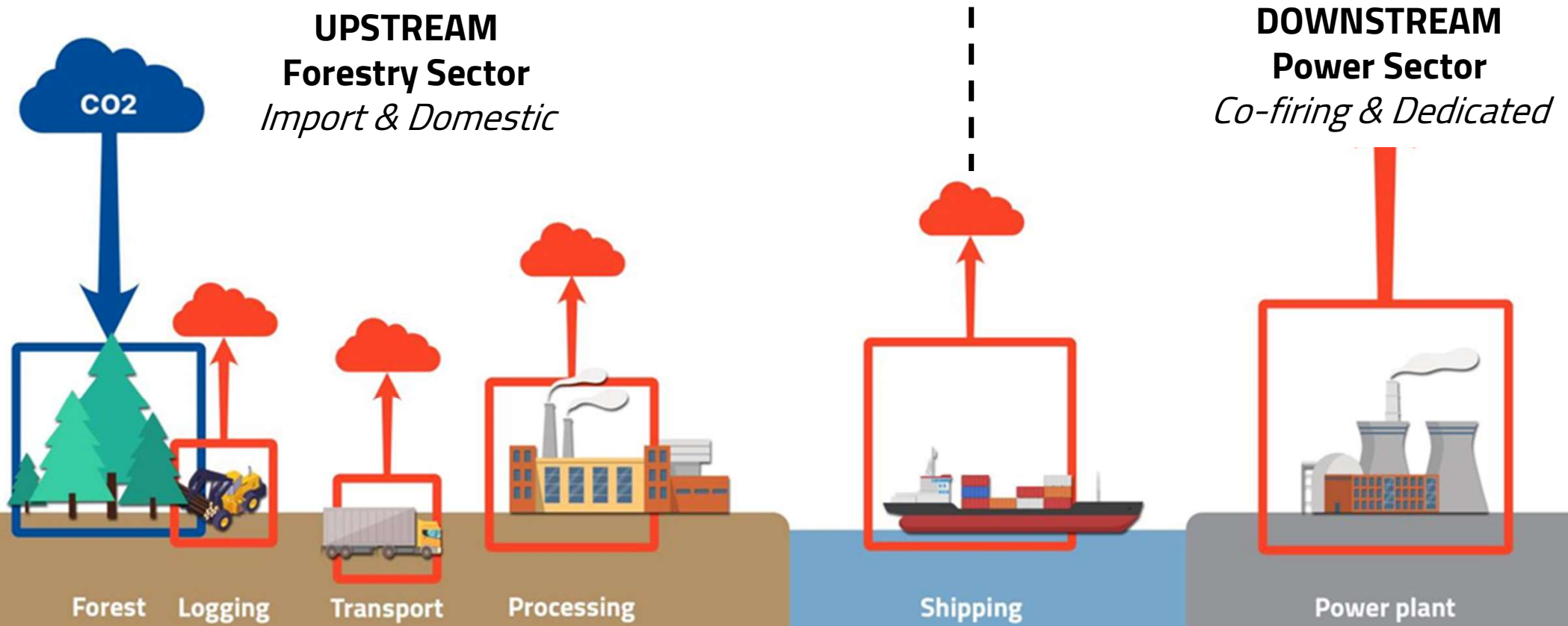
Figure 3. Biomass electricity generated in South Korea by feedstock type, 2022



Source: Ministry of Trade, Industry and Energy, 2023.

- **Biomass** → **63.7%** of all bioenergy
- **Forest feedstocks** → **75.3%** of all biomass
- Biomass in S. Korea → mostly for **utility-scale electricity-only generation**

# Biomass power, unlike genuine renewables, emits CO<sub>2</sub> throughout supply chains





# Upstream imported biomass: Heavy reliance on overseas forests

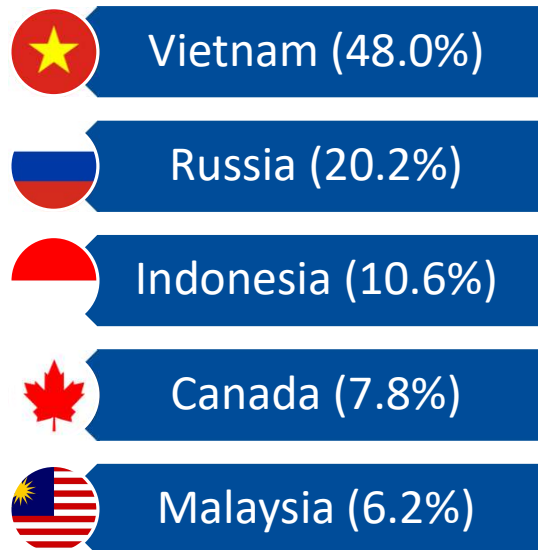
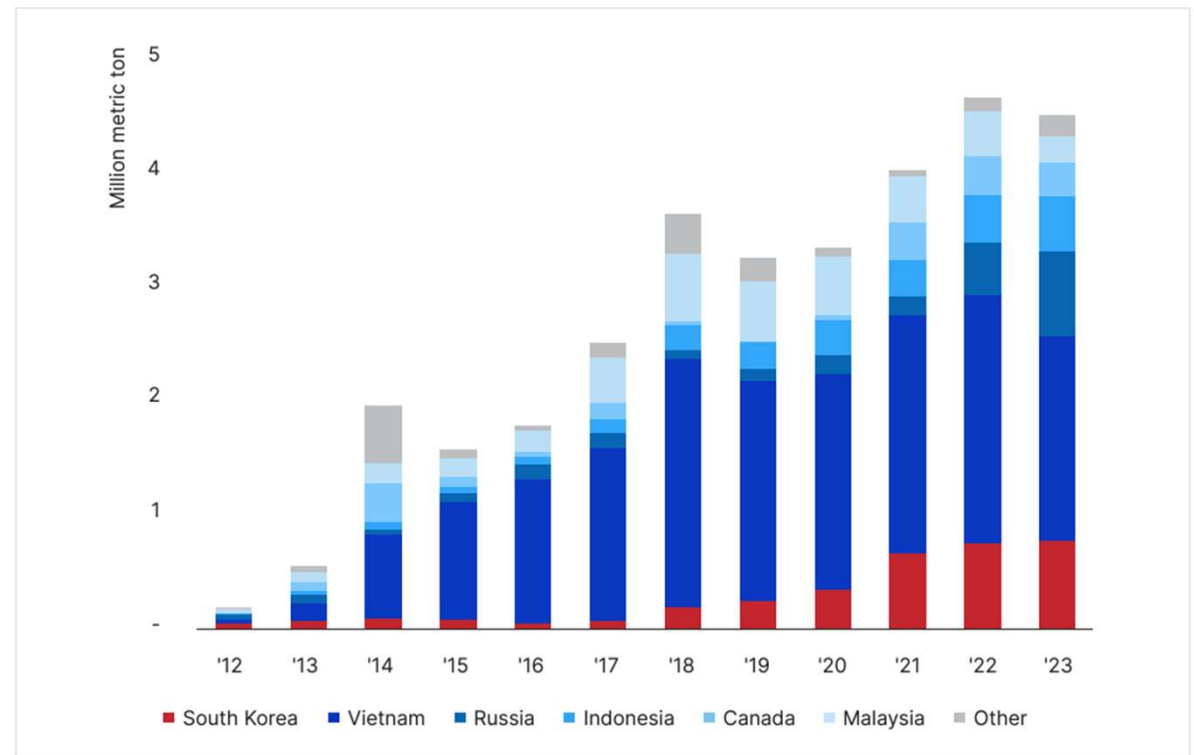


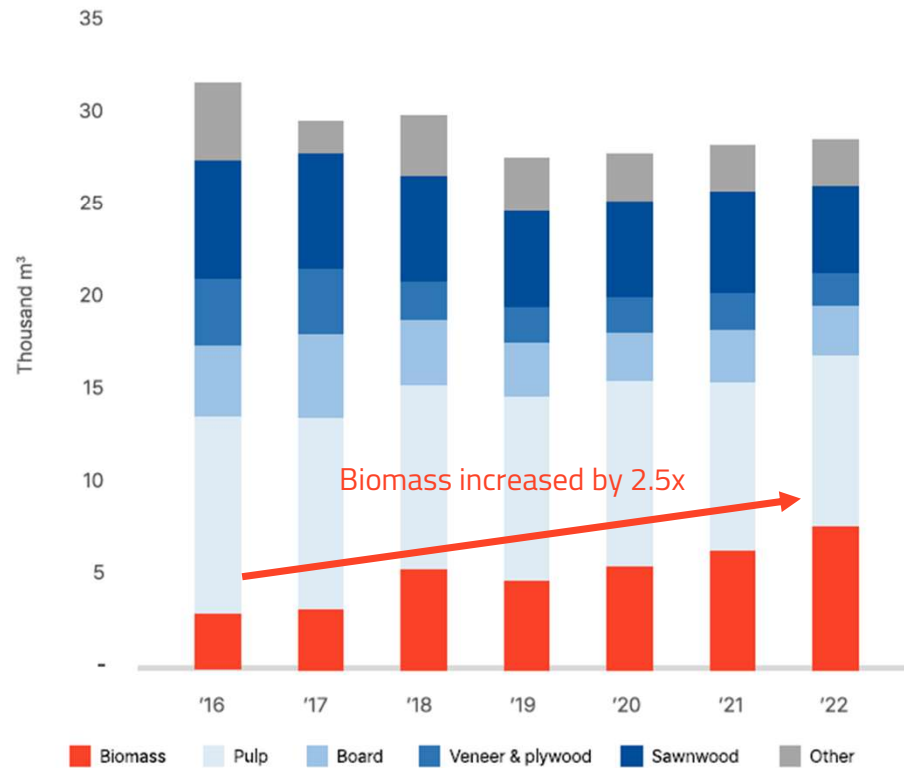
Figure 5. Wood pellet consumption in South Korea by country of origin



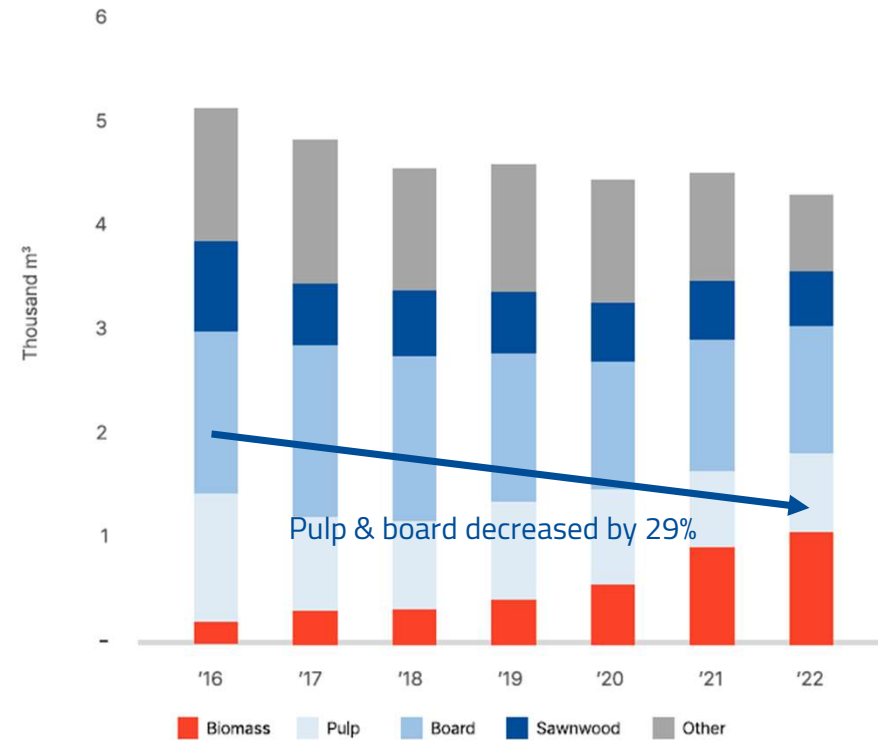
Sources: Korea Customs Service; Korea Forest Service.

# Upstream domestic forestry industry: Biomass causes feedstock competition

° Figure 5. Total wood consumption in South Korea by use type, 2016–2022



° Figure 6. Domestically sourced wood consumption in South Korea by use type, 2016–2022



# Downstream power industry: State-owned co-firing and private dedicated power plants

CO-FIRING		
Utility	Capacity (MW)	Co-firing rate (%)
Korea Midland Power (SOU)	4,000	1.2~5
	3,000	2.5~5
Korea South-East Power (SOU)	3,340	5
	3,240	5
	328.6	5
Korea Southern Power (SOU)	1022	5
	3,000	3~8
Korea East-West Power (SOU)	400	10
	2,000	4
OCI SE	303	70
SGC Energy	250	85
GS Pocheon Green Energy	169.9	10
Kumho Petrochemical	145	25
Hanhwa Energy	99	30

DEDICATED	
Utility	Capacity (MW)
Korea South-East Power (SOU)	325
GS EPS	205
SGC Energy	100
	60
CGN Daesan	100
LX International	43.2
Seokmun Energy	38.9
Jeonju Onepower	32.4
Korea East-West Power (SOU)	30
Seohae CHP	24.9
Jeonju Paper	15
M-Hanam	9.9
SG Energy	9.8
SUN&L	8.2
Eagon Energy	8.1
Sunwood	7.9
SD Energy	6.4
Enprotech	5
Janggun CHP	5

State-owned  
Private



### 3. Governance framework of forest biomass policy



# Biomass in S. Korea is managed by three government agencies



Ministry of Trade,  
Industry and Energy



Korea Forest Service



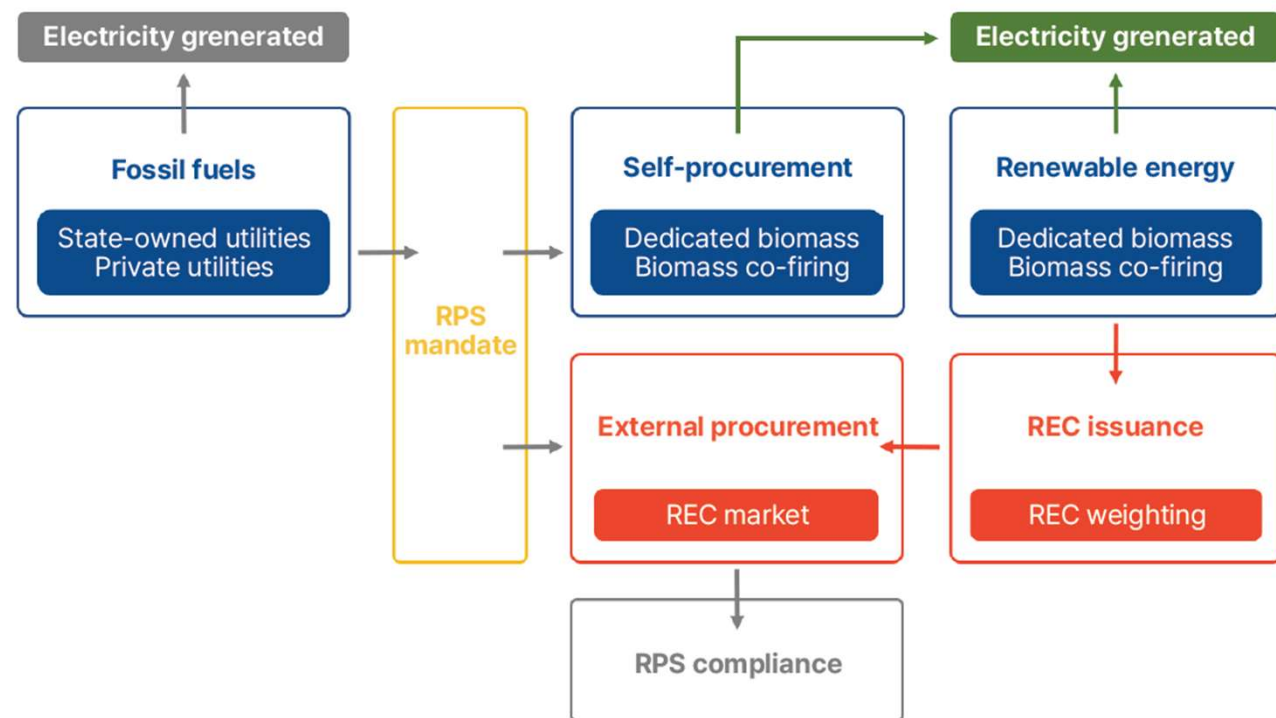
Ministry of Environment

MOTIE	KFS	ME
Renewable Portfolio Standard (RPS) Renewable Energy Credits (RECs)	Wood pellet & chip production	Managing greenhouse gas emissions
Indirect subsidies for biomass	Driver policy for biomass expansion	Non-accounting of biomass emissions

# MOTIE makes biomass profitable by letting power plants sell RECs

- Power utilities **>500 MW** are required to **meet renewable mandate** (13.5% in 2024, 25% by 2030) through either
  - 1) **self-procurement** or
  - 2) **REC purchases**
- **Renewable producers earn RECs**, with weightings contingent on renewable source and facility
- **REC weightings** determine the profitability of renewable energy

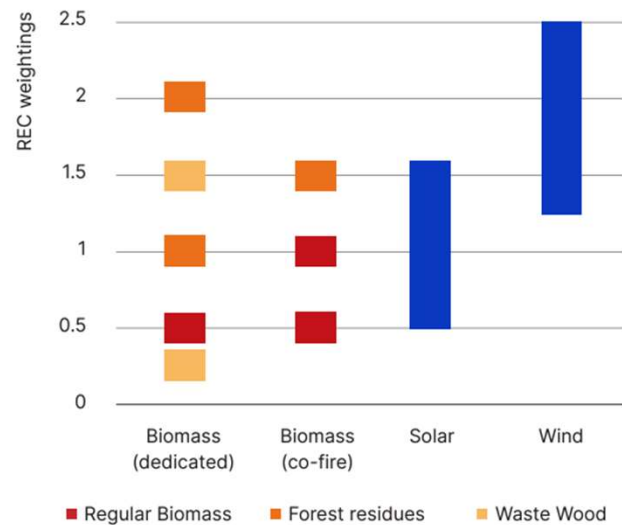
° Figure 4. Operational flowchart for RPS in the context of biomass





# MOTIE grants biomass REC weightings higher than solar or onshore wind

Figure 4. REC weightings by key electricity source in South Korea



Source: Ministry of Trade, Industry and Energy, 2023.

Table 10. REC weightings for biomass in South Korea

Feedstock	Type	Ownership	Year of operation	
			Before Jun '18	After Jun '18
Residues pellet/chip	Dedicated		2.0	
	Co-firing		1.5	
Regular pellet/chip	Dedicated	Private	1.5	0.5
	Co-firing		1.0	-
Bio-SRF	Dedicated	Public	0.5	-
	Co-firing		1.5	0.25
			1.0	-

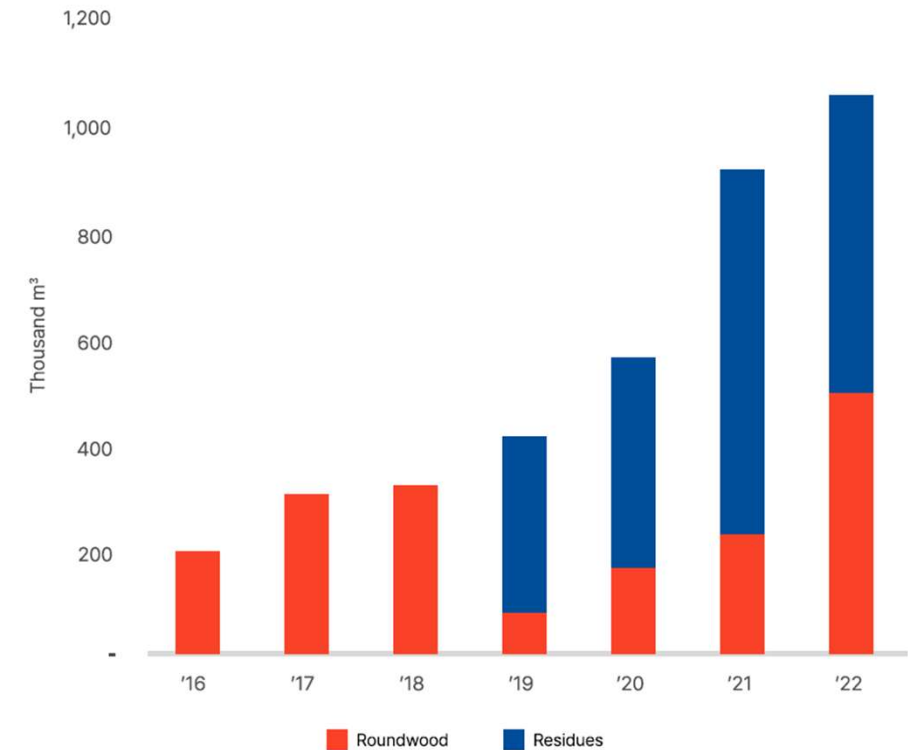
# KFS imposes legality requirements for imported biomass

Imported forest biomass fuels			
	Logging	Pelletizing	Importing
<b>Supervising agency</b>	Producer country government		Korea Forest Service, Korea Customs Service
<b>Relevant regulation</b>	Producer country forestry law		<i>Timber Use Act, Regulation to Promote Legal Timber Trade</i>
<b>Required document</b>	Producer country logging/business permit		Quality standard, Timber legality document

# KFS spearheads the growth of domestic biomass

Domestic forest biomass fuels		
	Logging	Pelletizing/chipping
<b>Regular forest biomass</b>		
Supervising agency	Korea Forest Service	Korea Forest Service
Relevant regulation	<i>Forest Resources Act</i>	<i>Timber Use Act</i>
Required document	Logging permit	Quality standard
<b>Forest residues</b>		
Supervising agency	Korea Forest Service, Local governments	Korea Forest Service
Relevant regulation	<i>Forest Resources Act</i> , <i>Forest Biomass Guidelines</i>	<i>Timber Use Act</i>
Required document	Logging permit, Forest residues application	Quality standard

° Figure 13. Wood used for biomass fuels in South Korea by wood type, 2016–2022



Source: Korea Forest Service, 2013–2023.



# 4. Consequences of energy & forest policy incentivizing forest biomass

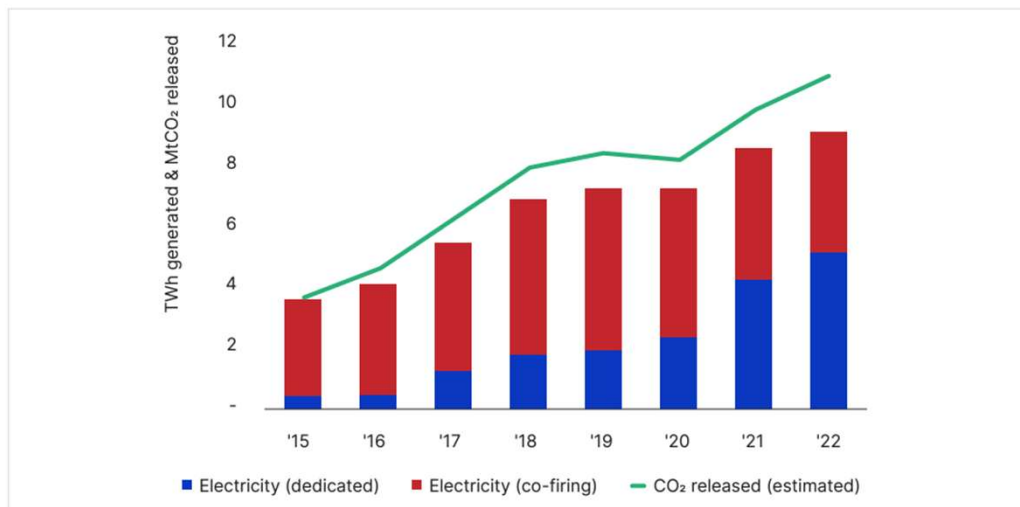


Photo: The Chosun Daily, 2021



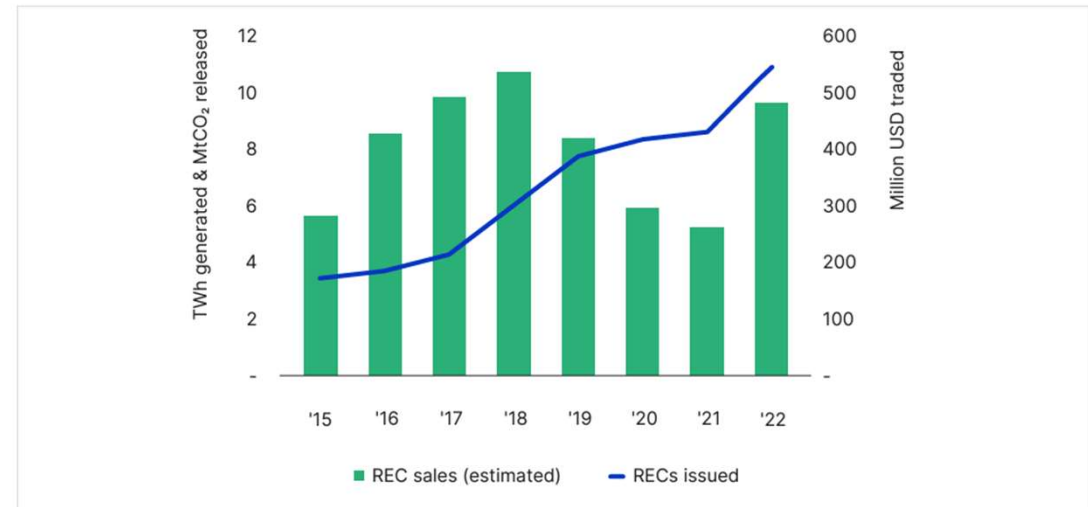
# Since 2015, S. Korean biomass power has received 3.7 bn USD worth of RECs for emitting 70 MtCO<sub>2</sub>

Figure 6. Biomass electricity and carbon emissions in South Korea



Sources: Solutions for Our Climate, 2024; Song, 2023; compiled by authors.

Figure 7. RECs issued to biomass and estimated value in cash terms



Sources: Solutions for Our Climate, 2024; compiled by authors.

# Lack of sustainability requirements for imported biomass fuels forest loss around the world

## Smoke, mirrors, wood pellets: Vietnam clears native forest to supply 'clean' energy to Asia

By Võ Kiều Bảo Uyên

19 November 2023 at 15:31 (Updated on 21 November 2023 at 10:34)

Expansive deforestation in Central Vietnam is being driven by the global demand for wood pellets—a supposedly green alternative to fossil fuels

**B B C**

Home News Sport Business Innovation Culture Travel Earth Video Live

## Drax: UK power station owner cuts down primary forests in Canada

3 October 2022

By Joe Crowley and Tim Robinson, BBC Panorama

Share ↗

Photo:  
Mekong  
Eye,  
2023

## The EU banned Russian wood pellet imports; South Korea took them all

by Justin Catanoso on 24 January 2023



Photo:  
Mongabay,  
2023

ARTICLES

## COAL-TO-BIOMASS TRANSITION FUELS DEFORESTATION IN INDONESIA

INCREASING DEFORESTATION WOULD RESULT  
IN UP TO 489 MILLION TONS OF ADDITIONAL  
EMISSIONS, THE THINK TANK TREND ASIA  
SAYS

by Matteo Cavallito

01 DEC 2022 11:00

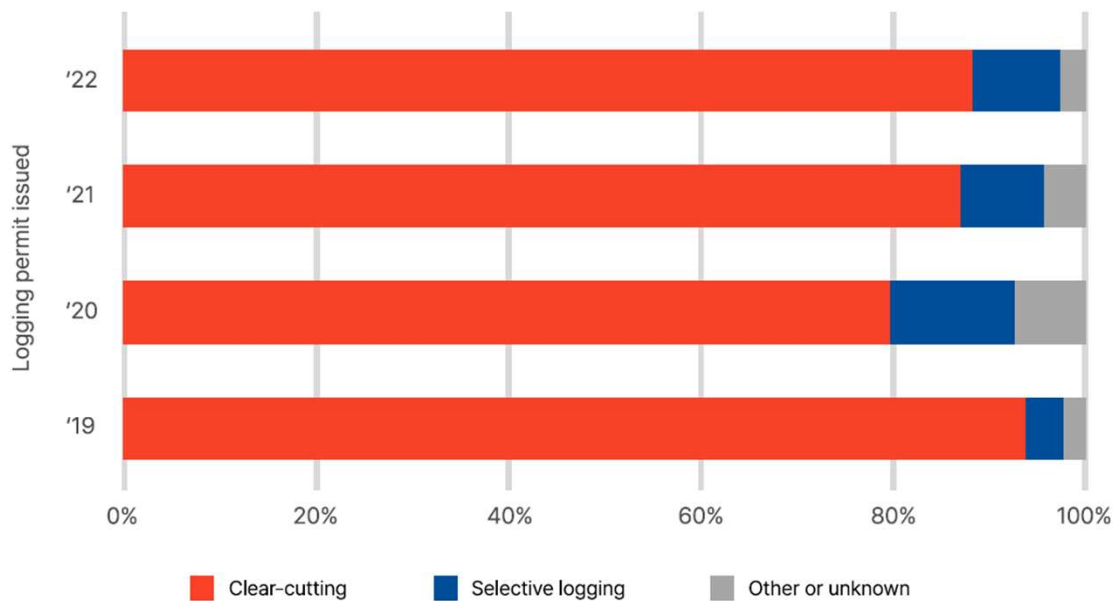


Photo:  
Renewable Matter,  
2022

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Solutions for Our Climate

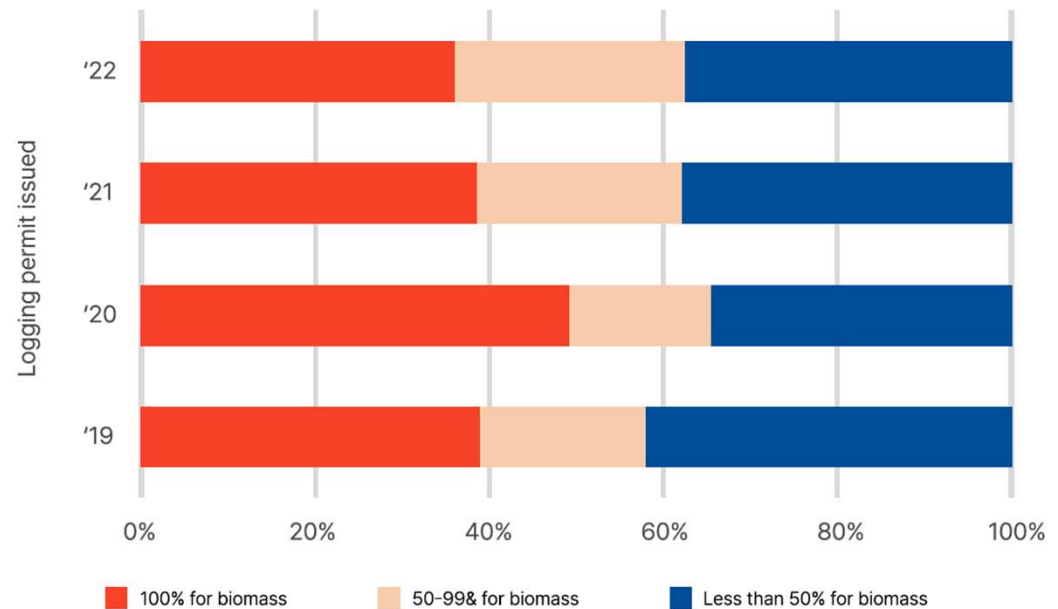
# KFS' unscrupulous definition of 'forest residues' leads to excessive logging in S. Korea

° Figure 15. Certified forest residues in South Korea by means of logging, 2019–2022



Source: Korea Forest Service, 2023; compiled by author.

° Figure 16. Ratio of forest residues to logging allowance in South Korea, 2019–2022

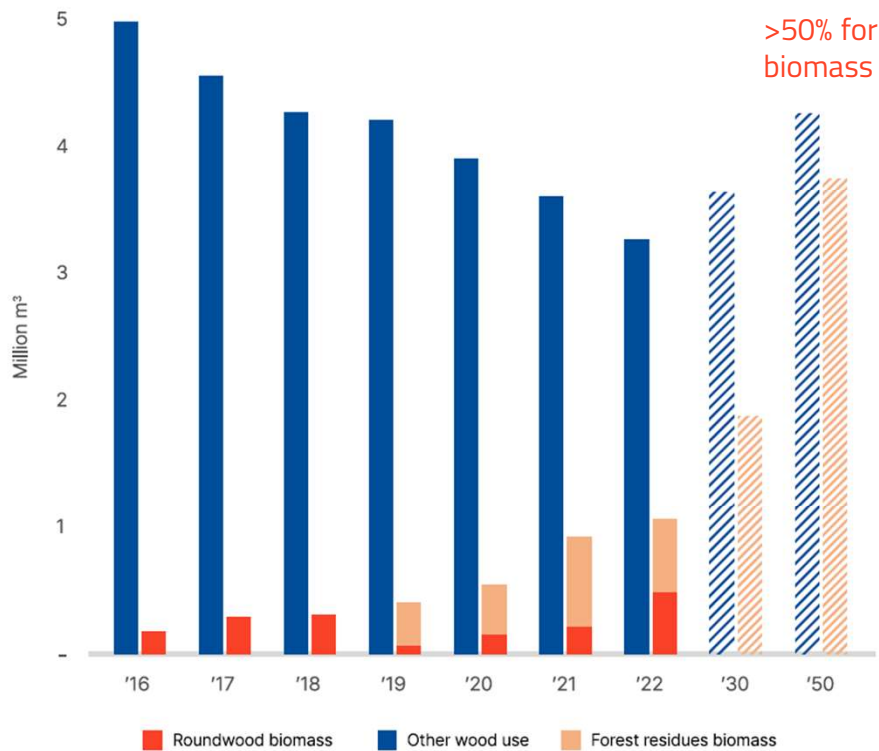


Source: Korea Forest Service, 2023; compiled by author.



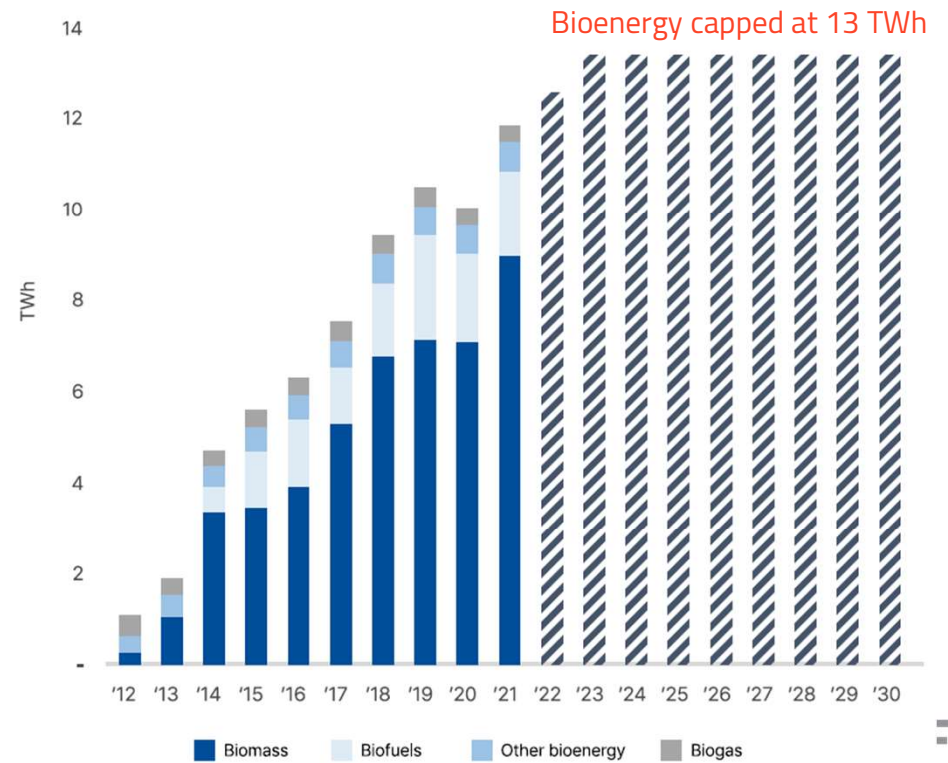
# Conflicting views: KFS seeks to further expand biomass while MOTIE shows skepticism

° Figure 18. KFS domestic production targets for forest biomass



Source: Korea Forest Service, 2021; compiled by author.

° Figure 19. MOTIE outlook on bioelectricity generation



Source: Ministry of Trade, Industry and Energy, 2023; compiled by author.

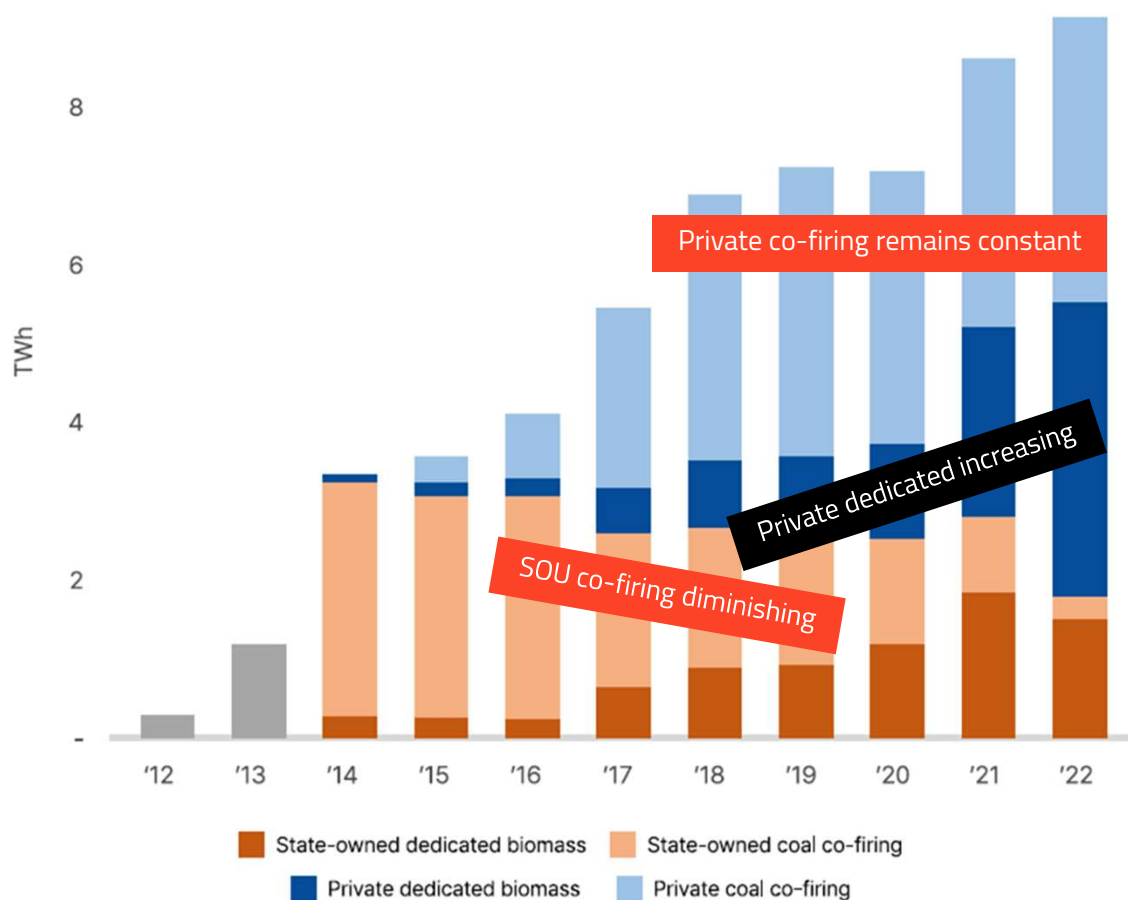






5.  
Industry trend:  
From state-owned co-firing  
to private dedicated



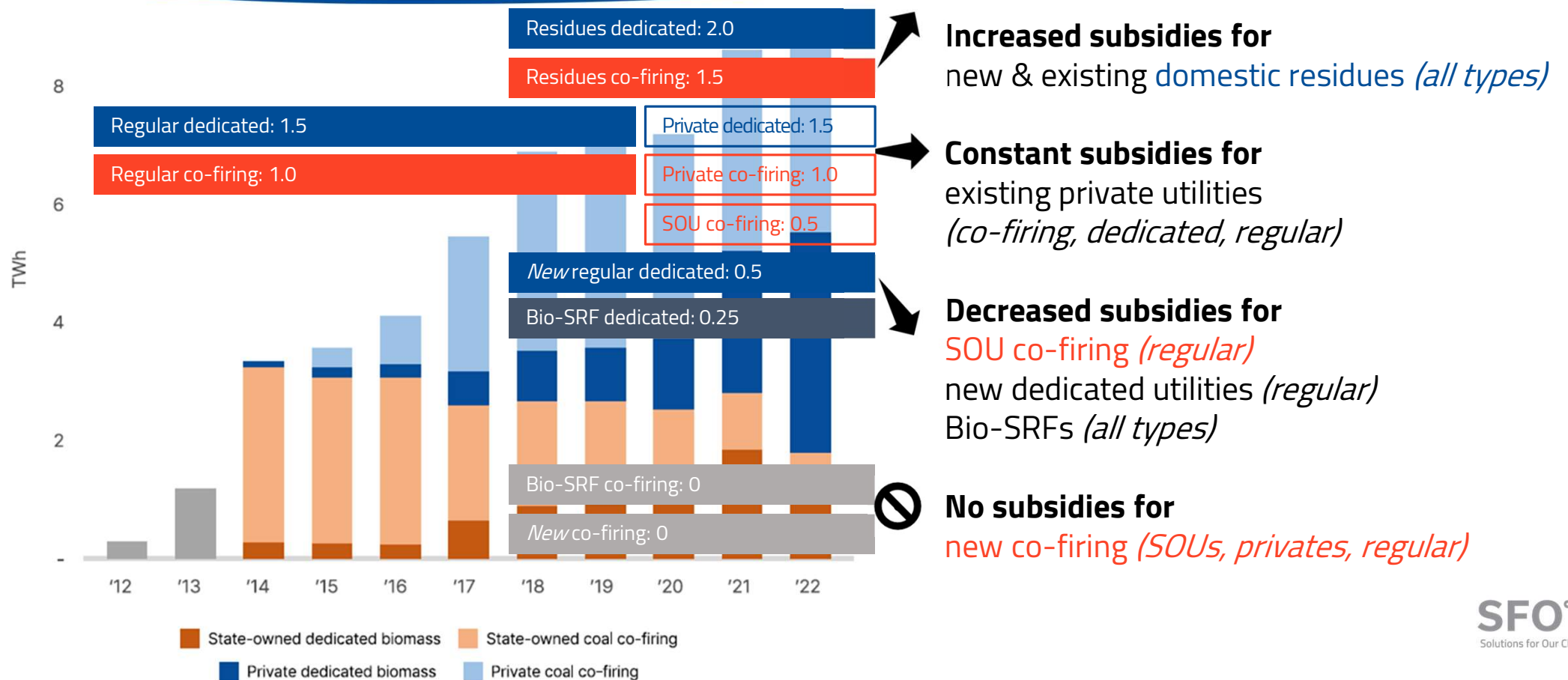


# No subsidies for new co-firing using imported biomass; more subsidies for burning 'forest residues'



- 
**Increased subsidies for**  
 new & existing *domestic residues (all types)*
- 
**Constant subsidies for**  
 existing private utilities  
*(co-firing, dedicated, regular)*
- 
**Decreased subsidies for**  
*SOU co-firing (regular)*  
 new dedicated utilities *(regular)*  
 Bio-SRFs *(all types)*
- 
**No subsidies for**  
*new co-firing (SOUs, privates, regular)*

# Shifts in biomass industry are triggered by changes in REC weightings over time





# Drivers for decrease in co-firing: Increased public awareness



Photo: KBS, 2021

High-carbon biomass grew 2x under Moon admin, resulting in \$ 1 bn subsidies

KEPCO subsidiaries to double down and build three additional plants

## 신재생에너지 가중치

예시	가중치
태양광	최소0.5~최대1.6
폐기물 에너지	0.25
지열	1.0~2.5
수력	1.5
목재펠릿·목재칩	0.5
미이용 산림바이오매스 혼소	1.5
미이용 산림바이오매스 전소	2.0

19일 오전 충북 진천군 초평면에 있는 목재 펠릿 생산 공장에 벌채된 나무와 부산물이 쌓여 있다. 수북한 나뭇가지 뒤로 공장에서 나오는 흰 연기가 선명하다./신현중 기자

Photo: The Chosun Daily, 2021

- Issue-raising on illegitimacy of co-firing
- Advocacy for fairer renewable market policy
- Exposing biomass-led forest loss

# Drivers for decrease in co-firing: Consensus among policymakers

“REC weightings for biomass co-firing to be further reduced”

변국영 기자 | bgy68@energydaily.co.kr | 승인 2020.10.15 11:11 | 댓글 0

MP Lee Sung-man “scrape or reduce REC weights for all biomass co-firing”



Photo: Energy Daily, 2020

Photo: Electimes, 2019

Biomass boom intensifies disruption of RE market

김예지 기자(kimyj@electimes.com) | 2019.12.05 17:38 | 조회수 3655 | 지면 5면

Solid biomass facility is in rapid growth  
Profitability from ‘uneven playing field’ is the cause  
Clear policy direction for biomass is needed



‘Overcompensated’ biomass  
REC weightings to be reduced

기사입력 2017-01-12 06:00:25 | 폰트크기 변경 A A

Government watchdog ordered MOTIE to readjust REC weightings.  
Utilities expected to respond to changed RPS system.

Photo: DNews, 2017

- “Co-firing takes away subsidies for renewables”
- “Utilities easily turn to co-firing instead of investing in renewables”
- “RECs for co-firing are too high compared to other renewables”

# Drivers for decrease in co-firing: Policy shift to dedicated burning

Photo: Agrinet, 2021

“Government should increase REC weightings for forest residues”

✎ 고성진 기자 | ⓒ 승인 2021.04.23 18:53 | □ 신문 3292호(2021.04.27) 2면

## Biomass co-firing utilities to double down on domestic feedstocks

최근주 기자(ckj114@electimes.com) **제보** | 입력 2021.09.01 10:57 수정 2021.09.02 08:41 호수 3900 지면 6면

SGC Energy, Hanhwa Energy, OCI SE to sunset RECs for imported wood pellets  
Expected to replace \$1.5 bn worth of imports and promote domestic biomass industry

### 민간 바이오혼소 수입펠릿 REC 일몰 업무협약식



박기영 산업통상자원부 2차관(가운데)이 1일 오후 전북 군산시 SGC에너지 군산 발전소에서 열린 '민간 바이오혼소 수입펠릿 REC 일몰 업무협약식'에서 참석자들과 기념촬영을 하고 있다.

Photo: Electimes, 2021

Photo: National Institute of Forest Science, 2022



- KFS speaks for the domestic forestry industry
- Strong advocacy for transitioning from co-firing imported biomass to dedicated burning of domestic forest residues

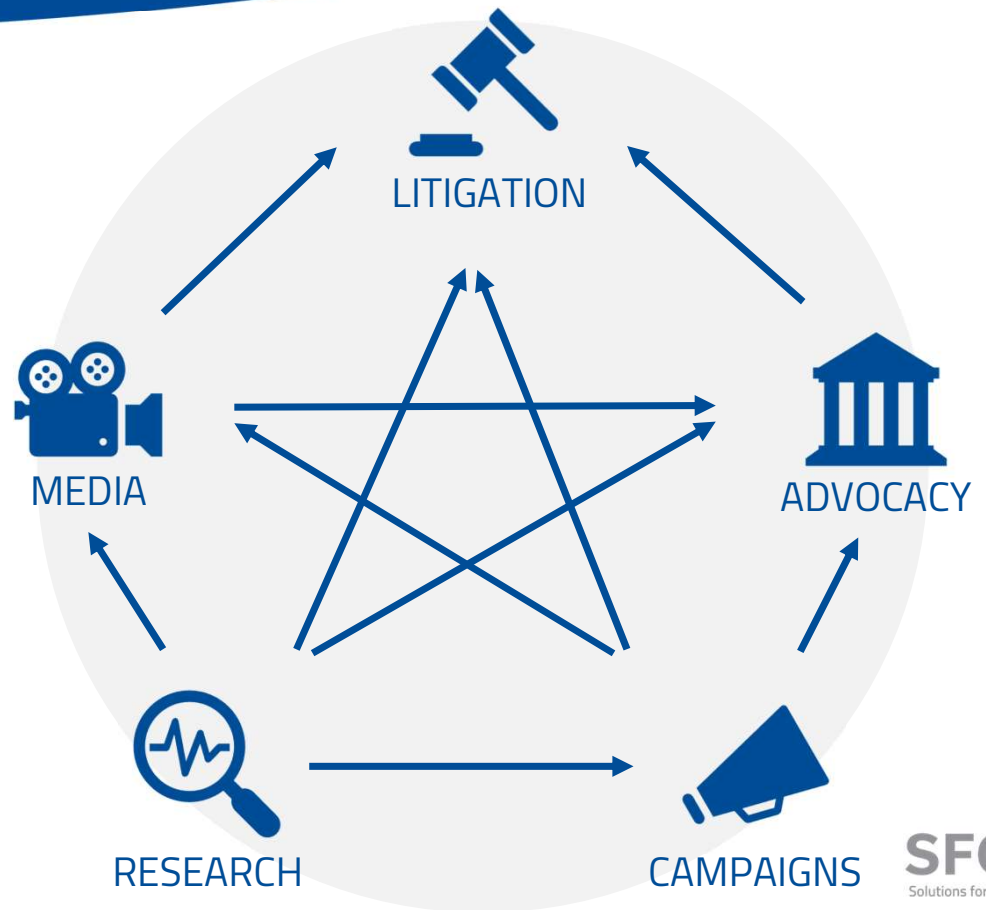


# 6. Mitigating forest biomass in South Korea





# Multi-faceted advocacy to build a climate & forests movement



# Litigation highlight 1: Strip biomass of its renewable license

Photo: FORESIGHT Climate & Energy, 2020

Type	Constitutional complaints (2020 & 2021)
Target	<ol style="list-style-type: none"><li>1. Inclusion of woody biomass as renewable energy in Renewable Energy ordinance</li><li>2. Excessive REC weightings for biomass in RPS ordinance</li><li>3. Exemption of accounting combustion emissions of biomass in emission trading system (ETS) ordinance</li></ol>
Plaintiff	<ol style="list-style-type: none"><li>1. Residents of planned biomass plant site in S. Korea</li><li>2. Residents of biomass sourcing site in Canada</li><li>3. Solar power cooperatives</li><li>4. General citizens</li></ol>
Rationale	<ol style="list-style-type: none"><li>1. Violation of rights to environment and life</li><li>2. Violation of rights to property</li><li>3. Violation of rights to equality</li></ol>
Ruling	<b>Dismissed</b> <ul style="list-style-type: none"><li>• Standing of both plaintiff and target clause revoked</li></ul>



# Litigation highlight 2: Remove renewable subsidies for biomass

Type	Administrative lawsuit (2020; active)
Target	REC weightings for biomass in RPS ordinance
Plaintiff	Solar power cooperatives
Defendant	MOTIE
Rationale	<ol style="list-style-type: none"><li>1. Climate and environmental impacts of biomass makes it unfit for REC-eligible renewable energy</li><li>2. Violation of principle of administrative rule of law</li><li>3. Violation of rights to equality</li><li>4. Violation of principle of proportionality</li></ol>
Ruling	<p>1st trial: <b>Dismissed in Apr 2023</b></p> <ul style="list-style-type: none"><li>• Standing of both plaintiff and target clause unrecognized</li><li>• Climate and environmental harms of biomass unsubstantiated</li></ul> <p>2nd trial in progress</p>

- MOTIE was requested with rationale behind supporting biomass and opinions on its environmental impact
- Court closely examined the arguments from both sides through 5 hearings, indicating the issue has permeated the courtrooms for the first time
- Standing remains an issue, but opened the door for further contention in the court of appeals

# Litigation highlight 3: Cancellation of biomass power plants

Type	Administrative lawsuit (2021)
Target	Proposed 200MW dedicated biomass power plant by Gunsan Bioenergy, set up by state-owned Korea Midland Power (KOMIPO) and Hana Financial group in 2015
Plaintiff	Gunsan Bioenergy
Defendant	City of Gunsan
Ruling of Supreme Court	<ul style="list-style-type: none"><li>• City of Gunsan rejection of the project met by the company's lawsuit in 2019</li><li>• City won the first and lost the second trial</li><li>• <b>Gunsan Bioenergy won Supreme court trial in Oct 2021</b></li><li>• <b>Years of delay forced the company to cancel the project</b></li><li>• City of Gunsan, KOMIPO and Doosan signed a MOU to in 2022 to build a hydrogen plant instead</li></ul>

Ally lawsuit in Hawaii (2023)

Energy

## Hawaii Supreme Court Unanimously Rejects Big Island's Hu Honua Power Project

The justices said state regulators were right to question environmental problems and consumer costs.



Photo: Honolulu Civil Beat, 2023



An aerial photograph of a dense, lush green forest. A dark, winding road or path cuts through the trees, curving from the upper right towards the center. The forest canopy is thick and vibrant green, with some lighter patches where sunlight hits. The overall scene is a natural, undisturbed landscape.

# 7. Next steps for safeguarding our forests and climate



# 2024 is a big year for biomass since MOTIE is poised to make revision to REC weightings

Policy	Triennial revision of REC weightings
Opportunities	<b>Elimination of REC weightings for biomass</b> <ul style="list-style-type: none"><li>• MOTIE sees biomass as 'bridge fuel' with a limited role to play in long term energy scenarios</li><li>• MOTIE is aware of heightened controversies around biomass and frustration from non-biomass timber industry</li></ul>
Risks	<b>Continuation of current weightings</b> <ul style="list-style-type: none"><li>• MOTIE's tendency to protect existing corporate profits and overlook environmental consequences of biomass</li><li>• Opaque revision process with minimal opportunity to intervene and lack of public awareness</li></ul>
Other implications	<ul style="list-style-type: none"><li>• Likely to be the final revision of REC weightings before RPS transitions to auction-based renewable markets</li><li>• Post-2024 biomass campaigns will require more private sector and market-oriented strategies</li></ul>

# KFS' consideration of biomass sustainability criteria can come with both positives and negatives

Policy	Introduction of sustainability criteria
Opportunities	<b>Reduction of high-risk roundwood and imported feedstocks</b>
Risks	<b>Distraction from phasing out biomass entirely and getting caught in technicalities</b>
Other implications	KFS- and Industry-led criteria are likely to be ineffective and greenwashing as like in Europe and North America

## KFS' proposed criteria of consideration for sustainability criteria

1. Prepare cascading principles of wood use in consideration of industry reality
2. Link with forest resource use policy in public development lands
3. Pilot project and research on lifecycle analysis-based carbon accounting
4. Research on improving landholder profit and localized energy use
5. Reduce RECs for imported wood pellets and improve certification levels
6. Develop guidelines on sustainable biomass harvest
7. Research positive impacts and those to forest environment resulting from biomass harvest



# Where biomass policy is headed in S. Korea: Private, domestic, and dedicated

## Very unlikely

- New co-firing  
*No RECs available for new co-firing of regular biomass*

## Unlikely

- Large-scale coal-to-biomass conversion  
*Decreased RECs for dedicated burning of regular biomass*
- Return of SOU co-firing  
*Decreased RECs for existing SOU co-firing*
- Small-scale and localized use of biomass  
*Lack of government support and incentives*

## Likely

- Continued co-firing by private utilities  
*RECs for existing private facilities remain the same*
- Increase in imported biomass for existing facilities  
*No meaningful restrictions on imported feedstocks*
- More Biomass-to-heat use in industrial complex

## Very likely

- More private burning of domestic forest residues  
*High RECs & policy focus of KFS and industry*  
*Highly incentivized yet feedstock availability is a question for large-scale deployment*

# Where biomass stands in 2024: A global perspective

Photo: UN Biodiversity, 2022



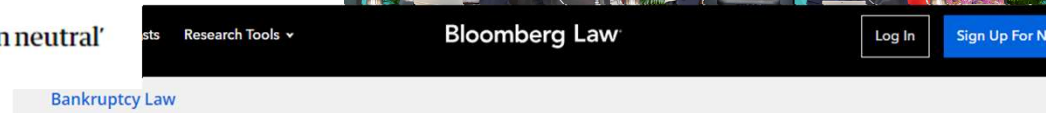
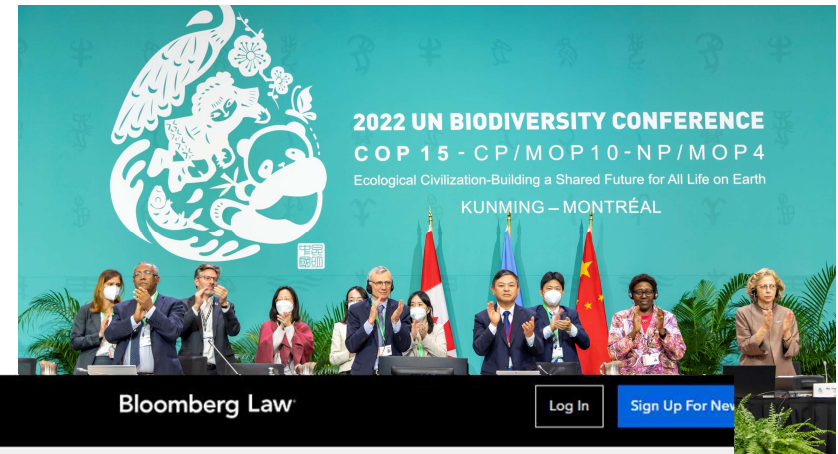
## The age of extinction

### Stop burning trees to make energy, say 650 scientists before Cop15 biodiversity summit



Letter says bioenergy is wrongly deemed 'carbon neutral'  
and contributes to wildlife loss

Photo: UN Climate Change, 2023



March 14, 2024, 4:30 AM GMT+9

## Top Biomass Power Supplier Enviva Files For Bankruptcy (1)

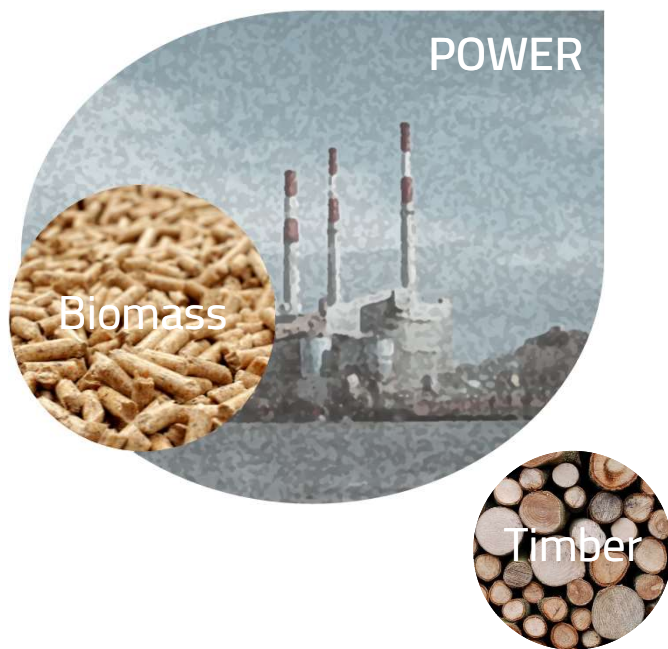
 **Will Wade**  
Bloomberg News

 **Janine Phakdeetham**  
Bloomberg News

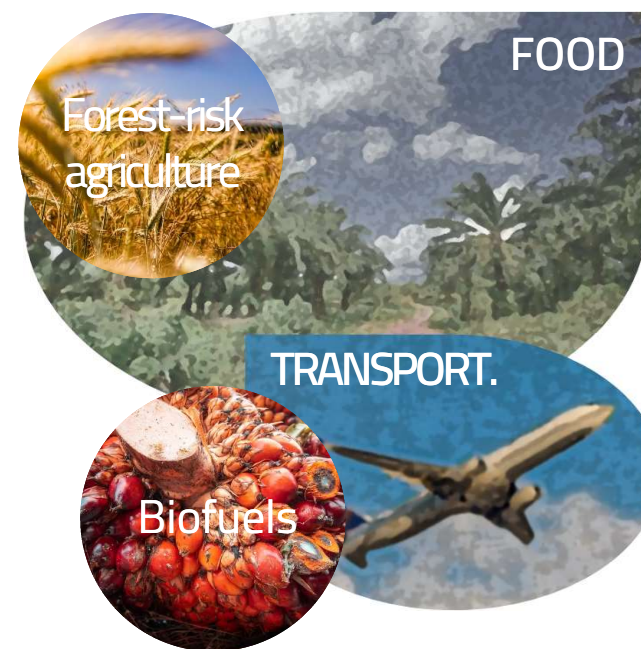
- The Maryland-based firm aims to cut \$1 billion of debt
- Company secured \$500 million in debtor-in-possession financing

# Biomass is only part of the East Asian demand for last remaining rainforests

## FOREST DEGRADATION



## DEFORESTATION





# Need for strengthened cross-boundary cooperation to fill in the action gap



REGIONAL  
COORDINATION



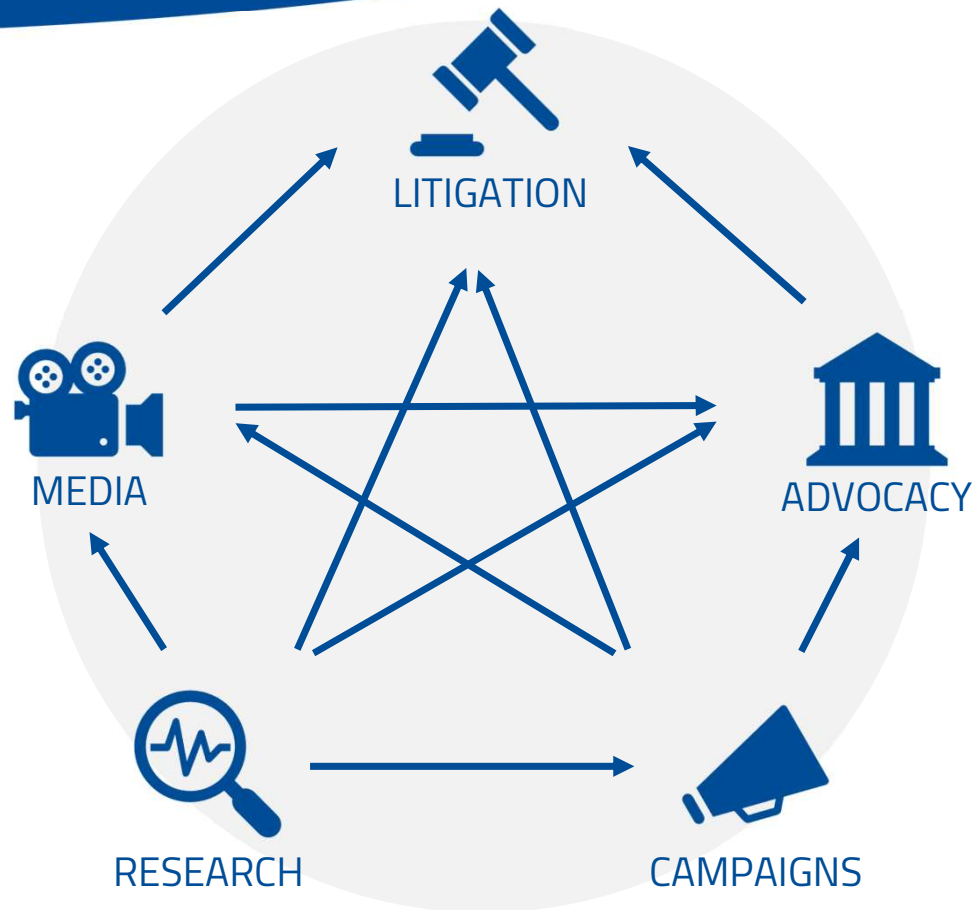
INTERNATIONAL  
ATTENTION



GRASSROOTS  
CONNECTION



PRIVATE & FINANCE  
ENGAGEMENT



Thank you

SFO°C  
Solutions for Our Climate

Inquiry

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